

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A chemically bonded biomaterial element composed of comprising an inorganic cement, exhibiting minimal dimensional changes upon hardening and long-time use, improved mechanical properties and improved translucency, characterised in wherein:

the biomaterial element has a micro-structure to meet an algorithm to describe the micro-structure, which is expressed as defined by a formula:

$$\lambda = \frac{d * (1 - V_F)}{(V_F)}$$

where λ is the distance between filler particles of mean size d , and V_F is the volume content of non-reacted cement and added filler, and where $\lambda \leq 10 \mu\text{m}$, and

wherein added inert filler particles have a particle size below 5 μm , and

wherein the inert filler particles consist of glass particles, apatites, brucite and/or bohmite.

2. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein $\lambda \leq 8 \mu\text{m}$, even more preferred $\lambda \leq 4 \mu\text{m}$ and most preferred $\lambda \leq 2 \mu\text{m}$.

3. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein V_F is less than 50 %, preferably 5-45 % and even more preferred 15-35 %.

4. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein it exerts a pressure or tensile force of $< 5 \text{ MPa}$, even more preferred $< 2 \text{ MPa}$ and and even more preferred $< 1 \text{ MPa}$, on a surrounding volume.

5. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein

the inorganic cement phase is composed of comprises Ca-aluminate, and/or Casilicate and/or or Ca-phosphate, or a mixture thereof.

6. (Currently Amended) A biomaterial element according to claim 1, characterised in that wherein

the inorganic cement phase is composed of phases in the $\text{CaO}-\text{Al}_2\text{O}_3$ system, i.e. CaO , $(\text{CaO})_2\text{Al}_2\text{O}_3$, $(\text{CaO})_3(\text{Al}_2\text{O}_3)_2$, CaOAl_2O_3 , $(\text{CaO})(\text{Al}_2\text{O}_3)_2$, $(\text{CaO})(\text{Al}_2\text{O}_3)_6$ and/or pure Al_2O_3 , with varying relative contents, where the preferred main phases are CaOAl_2O_3 and $(\text{CaO})(\text{Al}_2\text{O}_3)_2$ and the most preferred main phase is CaOAl_2O_3 ; and

a particle size of formed hydrates of these phases being is below 3 μm , even more preferred below 1 μm and most preferred below 0.5 μm .

7. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein the biomaterial element it also further comprises an organic phase of preferably polyacrylates and/or polycarbonates and preferably at a volume content of [[<]] less than 5 %.

8-9. (Cancelled)

10. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein it comprises in-situ formed apatite or some other phase that separates the formed hydrates of the main system.

11. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein a total porosity is below 10 %, even more preferred below 5 %, distributed on where at least 90% of the pores are minipores having a diameter below 0.5 μm , even more preferred below 0.1 μm , to an extent of at least 90 % of the total porosity.

12. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein it is a dental material, preferably a dental filling material or a root filling material.

13. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein the biomaterial element contains it is an orthopaedic material or a bone cement.

14. (Currently Amended) A The biomaterial element according to claim 1, characterised in that wherein it is a component, or is in granule form, preferably as or in a carrier material for drug delivery.

15. (Cancelled)

16. (New) The biomaterial element according to claim 1, wherein $\lambda \leq 4 \mu\text{m}$.

17. (New) The biomaterial element according to claim 1, wherein $\lambda \leq 2 \mu\text{m}$.

18. (New) The biomaterial element according to claim 1, wherein V_F is 5-45 %.

19. (New) The biomaterial element according to claim 1, wherein V_F is 15-35 %.

20. (New) The biomaterial element according to claim 1, wherein it exerts a pressure or tensile force of < 2 MPa on a surrounding volume.

21. (New) The biomaterial element according to claim 1, wherein it exerts a pressure or tensile force of < 1 MPa on a surrounding volume.

22. (New) The biomaterial element according to claim 6, wherein the $\text{CaO-Al}_2\text{O}_3$ system is CaO , $(\text{CaO})_3\text{Al}_2\text{O}_3$, $(\text{CaO})_{12}(\text{Al}_2\text{O}_3)_7$, CaOAl_2O_3 , $(\text{CaO})(\text{Al}_2\text{O}_3)_2$, $(\text{CaO})(\text{Al}_2\text{O}_3)_6$ or pure Al_2O_3 or a mixture thereof.

23. (New) The biomaterial element according to claim 6, wherein a main phase of the CaO-Al₂O₃ system is CaOAl₂O₃ or (CaO)(Al₂O₃)₂.

24. (New) The biomaterial element according to claim 6, wherein a main phase of the CaO-Al₂O₃ system is CaOAl₂O₃.

25. (New) The biomaterial element according to claim 6, wherein a particle size of formed hydrates of these phases is below 1 μm .

26. (New) The biomaterial element according to claim 6, wherein a particle size of formed hydrates of these phases is below 0.5 μm .

27. (New) The biomaterial element according to claim 1, wherein added inert filler particles have a particle size below 2 μm .

28. (New) The biomaterial element according to claim 1, wherein a total porosity is below 5 %, distributed on minipores having a diameter below 0.1 μm , to an extent of at least 90 % of the total porosity.

29. (New) A biomaterial element according to claim 12, wherein the dental material is a dental filling material or a root filling material.